

15 NOV 1999

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/423619

INTERNATIONAL APPLICATION NO.  
PCT/EP98/02706INTERNATIONAL FILING DATE  
08 May 1998PRIORITY DATE CLAIMED  
14 May 1997TITLE OF INVENTION  
INNER SOLE FOR A SHOEAPPLICANT(S) FOR DO/EO/US  
SEITER, Hans

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

## Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.  
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
  - Executed Small Entity Statement
  - Published International Application WO 98/51178
  - English translation of annexes to International Preliminary Examination Report
  - International Preliminary Examination Report

PCT/EP98/02706

09/423619

15 NOV 1999

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492(a)(1) - (5)):**

Neither international preliminary examination fee (37 CFR 1.482)  
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO  
and International Search Report not prepared by the EPO or JPO. .... \$970.00

International preliminary examination fee (37 CFR 1.482) not paid to  
USPTO but International Search Report prepared by the EPO or JPO ..... \$840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO  
but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$760.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)  
but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$670.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)  
and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$96.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

CALCULATIONS PTO USE ONLY

\$ 840 00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	10 - 20 =		X \$18.00
Independent claims	2 - 3 =		X \$78.00

\$

\$

MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$260.00

\$

**TOTAL OF ABOVE CALCULATIONS =**

\$ 840 00

Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement  
must also be filed (Note 37 CFR 1.9, 1.27, 1.28).

\$ 420 00

**SUBTOTAL =**

\$ 420 00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =**

\$ 420 00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +

\$

**TOTAL FEES ENCLOSED =**

\$ 420 00

Amount to be:

refunded \$

charged \$

a. ☒ A check <sup>No. 14153</sup> in the amount of \$ 420.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any  
overpayment to Deposit Account No. 10-1213. A duplicate copy of this sheet is enclosed.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Felix J. D'Ambrosio  
JONES, TULLAR & COOPER, P.C.  
P.O. Box 2266 Eads Station  
Arlington, VA 22202

Date: 15 Nov. 1999

SIGNATURE:

Felix J. D'Ambrosio

NAME

25,721

REGISTRATION NUMBER

3725 018

Applicant or Patentee: Hans SEITER  
Serial or Patent No. : \_\_\_\_\_  
Filed or Issued: \_\_\_\_\_  
For: CIRCUIT FOR THE PROTECTION OF ELECTRICAL DEVICES

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY  
STATUS (37 CFR 1.9(f) and 1.27(b)) - INDEPENDENT INVENTOR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled CIRCUIT FOR THE PROTECTION OF ELECTRICAL DEVICES

described in

X the specification filed herewith.

\_\_\_\_\_ application serial no. \_\_\_\_\_, filed \_\_\_\_\_

\_\_\_\_\_ patent no. \_\_\_\_\_, issued \_\_\_\_\_

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

X no such person, concern, or organization

\_\_\_\_\_ persons, concerns or organization listed below\*

\*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

\_\_\_\_\_ INDIVIDUAL \_\_\_\_\_ SMALL BUSINESS CONCERN \_\_\_\_\_ NONPROFIT ORGANIZATION

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

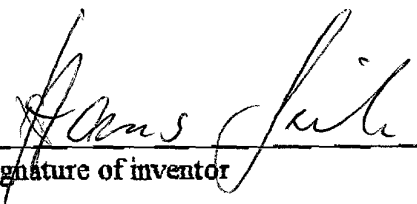
NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small business entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Hans SETTER  
Name of inventor

  
Signature of inventor

Date X 23.9.99

420 Rec'd PCT/PTO 15 NOV 1999

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of )

Hans Seiter )

Appl. No. : TBA )

Filed : November 15, 1999 )

For : INNER SOLE FOR A SHOE )

PRELIMINARY AMENDMENT

Honorable Commissioner of Patents and Trademarks  
 Washington, D.C. 20231

Sir:

Prior to an examination on the merits, please amend this application as follows:

AMENDMENTSIN THE SPECIFICATION:

Page 1, line 2, change "Specification" to

--Field of the Invention--;

line 3, change "instant" to --present--;

line 4, delete ", in accordance with the";

line 5, change "preamble of claim 1, or respectively claim 4" to --having an  
 inner sole with a sole base body, a sole cover layer and several cushion layers arranged on the  
 surface of the sole.--;

between lines 5 and 6, insert

--Background of the Invention--; and

line 31, between "(" and "DE" insert --German Patent,--.

Page 2, line 2, between "from" and "DE" insert --German Patent,--, and change "the pillow-like" to --cushioned--;

line 7, between "from" and "DE" insert --German Patent,--;

line 11, change "in a view" to --when viewed--;

between lines 17 and 18, insert

--An inner pole for a shoe is also known from U.S. Patent 4,633,877, wherein an intermediate sole is put together from individual elements over its entire surface, of which a segment, which is arranged in the forefoot joint area, is divided into individual sub-segments. The sub-segments adjoin each other in the transverse direction of the sole surface. The individual segments and sub-segments are each flat and of the same thickness. By means of a differently resilient embodiment, this known inner sole for a shoe is used for the differentiated support of the foot, wherein the position of the segments takes into consideration the position of the corresponding bones of the foot.

A similar purpose is sought in European Patent, EP 0 316 289 A, wherein the inner sole of the shoe is provided with hollow spaces distributed over the sole surface, which can be filled with a resilient material corresponding to the shape of the foot. Such an inner sole for a shoe is used for orthopedic correction.

Summary of the Invention--;

line 18, change "the" (first occurrence) to --an--, and change "create" to --provide--;

line 25, delete "characteristics recited in claim 1,";

line 26, change "or respectively in claim 4," to --a first cushioned layer is provided in the forefoot joint area, a second cushioned layer in the metatarsus/tarsus transition area, and a third cushioned layer in the metatarsus/heel transition area. Each of these cushioned layers, which are provided for aiding the venous outflow of blood, is itself divided into individual plateau-like fields, which are positioned next to each other in the transverse direction of the sole surface and are separated from each other. The surface of the cushioned layers, which are also covered by the sole cover layer, approximately forms a plane with the surface of the sole base body--; and

line 30, between "the" and "invention" insert --present--, and change "pillow-like" to --cushioned--.

Page 3, line 13, change "like" to --cushioned--;

line 15, after "the" insert --present invention,--;

line 16, delete in its entirety;

line 17, change "like" to --cushioned--;

lines 19-23, delete in their entirety;

line 24, change "the characteristics of claims 16 or 17" to --one embodiment--;

line 28, between "the" and "invention" insert --present--; and

line 31, delete "Shown are in:".

Page 4, before line 1, insert

--Brief Description of the Drawings--;

line 1, between the "," and "a" insert --is--;

line 4, between the "," and "a" insert --is--;

line 6, between the "," and "a" insert --is--;

line 9, between the "," and "respectively" insert --are--;

line 12, between the "," and "a" insert --is--;

line 15, between the "," and "a" insert --is--;

line 17, between the "," and "an" insert --is--;

line 19, between the "," and "a" insert --is--;

line 22, between the "," and "a" insert --is--;

line 24, between the "," and "a" insert --is--;

line 26, between "the" and "invention" insert --present--; and

line 27, between the "," and "a" insert --is--.

Page 5, between lines 2 and 3, insert

--Description of the Preferred Embodiment--;

line 14, change "pillow-like" to --cushioned--;

line 16, change "pillow-like" to --cushioned--;

line 21, change "pillow-like" to --cushioned--;

line 23, change "pillow-like" to --cushioned--;

line 31, change "pillow-like" to --cushioned--;

line 32, change "pillow-like" to --cushioned--; and

line 34, change "pillow-like" to --cushioned--.

Page 6, line 6, change "pillow-like" to --cushioned--;

line 7, change "pillow-like" to --cushioned--;



line 9, delete "the";

line 15, change "pillow-like" to --cushioned--;

line 20, change "pillow-like" to --cushioned--;

line 21, change "approximately" to --approximate--;

line 23, change "pillow-like" to --cushioned--; and

line 30, between the "," and "constitutes" insert --and--.

Page 7, line 3, change "pillow-like" to --cushioned--;

line 8, change "pillow-like" to --cushioned--;

line 9, change "pillow-like" to --cushioned--;

line 11, change "38" to --36--;

line 12, change "pillow-like" to --cushioned--;

line 13, change "lies" to --lie--;

line 14, change "pillow-like" to --cushioned--;

line 17, change "pillow-like" to --cushioned--;

line 20, delete "pillow-";

line 21, change "like" to --cushioned--;

line 26, change "in" to --with--;

line 29, change "pillow-like" to --cushioned--;

line 30, delete "of this";

line 31, change "pillow-like" to --cushioned--;

line 34, change "in" (second occurrence) to --with--; and

line 36, change "pillow-like" to --cushioned--.

Page 8, line 5, change "pillow-like" to --cushioned--;

line 10, change "pillow-like" to --cushioned--;

line 13, change "pillow" to --cushion--;

line 21, change "pillow-like" to --cushioned--;

line 22, change "52" to --52'--;

line 23, change "38" to --38'--, and change "pillow-like" to --cushioned--;

Page 9, line 3, change "pillow-like" to --cushioned--;

line 5, change "36" to --136--;

line 7, change "pillow-like" to --cushioned--;

line 8, change "pillow-like" to --cushioned--;

line 23, change "153" to --152--;

line 25, change "pillow-like" to --cushioned--;

line 31, change "pillow-like" to --cushioned--; and

line 34, change "pillow-like" to --cushioned--.

Page 10, line 2, delete "said";

line 4, change "pillow-like" to --cushioned--;

line 8, change "pillow-like" to --cushioned--;

line 11, delete "pillow-";

line 12, change "like" to --cushioned--;

line 15, change "pillow-like" to --cushioned--;

line 16, change "pillow-like" to --cushioned--;

line 22, change "in" to --with--;

line 26, change "pillow-like" to --cushioned--;

line 29, change "pillow-like" to --cushioned--;

line 31, after "former" inset --fields--;

line 34, change "pillow-like" to --cushioned--; and

line 35, change "pillow-like" to --cushioned--.

Page 11, line 4, change "pillow-like" to --cushioned--.

IN THE CLAIMS:

Please cancel claims 1-20 without prejudice or disclaimer of the subject matter thereof.

Please add the following new claims:

21. An inner sole of a shoe, comprising:

a sole base body defining a sole surface and having a forefoot joint area, a metatarsus/tarsus area, a metatarsus/heel transition area, a heel area, and a plantar arch area;

a sole cover layer;

a first cushioned layer provided in said forefoot joint area;

a second cushioned layer provided in said metatarsus/tarsus transition area;

and

a third cushioned layer provided in said metatarsus/heel transition area,

wherein:

said first, second and third cushioned layers are provided for aiding the venous outflow of blood;

said first, second and third cushioned layers are each divided into individual

plateau-like fields, separated from but positioned next to each other in the transverse direction of said sole surface;

each cushioned layer defines a surface, which together approximately forms a plane with said sole surface; and

said sole cover layer covering said surface of each cushioned layer and said sole surface.

22. The inner sole as defined in claim 21, further comprising:

a fourth cushioned layer provided in said heel area, said fourth cushioned layer defining a surface which is plateau-shaped and approximately forms a plane with said sole surface.

23. The inner sole as defined in claim 22, wherein said fourth cushioned layer is ovally homogenous in the transverse direction of said sole base.

24. The inner sole as defined in claim 22, further comprising:

a fifth cushioned layer provided in said plantar arch area, said fifth cushioned layer being in the shape of a sickle.

25. The inner sole as defined in claim 24, wherein each cushioned layer is recessed in said sole base body.

26. The inner sole of a shoe, comprising:

a sole base body, defining a sole surface and having a forefoot joint area, a metatarsus/tarsus area, a metatarsus/heel transition area, a heel area, and a plantar arch area;

a sole cover layer;

a first cushioned layer provided in said forefoot joint area;

a second cushioned layer provided in said metatarsus/tarsus transition area;

and

a third cushioned layer provided in said metatarsus/heel transition area,

wherein:

said first, second and third cushioned layers are provided for aiding the venous outflow of blood;

said first, second and third cushioned layers are each divided into individual plateau-like fields, separated from but positioned next to each other in the transverse direction of said sole surface;

each cushioned layer defines a surface, which are each raised with respect to said sole surface; and

said sole cover layer covering said surface of each cushioned layer and said sole surface.

27. The inner sole as defined in claim 26, further comprising:

a fourth cushioned layer provided in said heel area, said fourth cushioned layer defining a surface which is plateau-shaped and is raised with respect to said sole surface.

28. The inner sole as defined in claim 27, wherein said fourth cushioned layer is ovally homogeneous in the transverse direction of said sole base.

29. The inner sole as defined in claim 27, further comprising:

a fifth cushioned layer provided in said plantar arch area, said fifth cushioned layer being in the shape of a sickle.

30. The inner sole as defined in claim 29, wherein each cushioned layer is recessed


in said sole base body.

REMARKS

The above amendments are intended to place this application in better condition for examination.

Submitted herewith is page 16 of the application containing an abstract of the disclosure.

Respectfully submitted,

  
Felix J. D'Ambrosio  
Reg. No. 25,721

November 15, 1999

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420 Rec'd PCT/PTO 15 NOV 1999

Title: Inner Sole for a Shoe

## Specification

The instant invention relates to an inner sole for a shoe, which is embodied as a foot support, in accordance with the preamble of claim 1, or respectively claim 4.

On the average, every fifth person in the age group between 20 and 70 years needs treatment because of diseased veins, and particularly every third person suffers from pathological vein changes which, although they do not yet need invasive treatment, nevertheless cause troubles and may need treatment in the future. In general, the cause of this often is a genetically caused weakness of the connective tissues, which leads to a relaxation of the walls of the veins and therefore to a lack in the ability of the venous valves to close. This results in a reduction of the venous return flow from the legs into the body.

Supportive measures are known in the form of so-called pressure hose, but preventive measures are unknown, in particular in connection with people who, because of their occupation, perform predominantly sitting or standing tasks. In these cases it is suggested to move the legs as much as possible in order to increase the venous return flow from the legs back into the body by promoting the so-called foot and calf muscle pump. This is aided to a great extent by walking barefoot, however, the shoes which are customary these days have a rather disadvantageous effect.

Walking shoes are known, wherein resilient layers in the form of supports are used in the heel area. But these known resilient layers are merely intended to compensate the specific overloads occurring during walking, or at least to assist in partially preventing them (DE 39 02 872 A1).

In connection with an orthopedic inner sole for shoes known from DE 87 00 681 U1, the pillow-like layers are also embodied as an arched padding, which protrudes upward above the covering layer of the soles, and is provided in one piece with a large surface for support and pressure distribution in defined areas of the foot. An inner sole for a shoe is moreover known from DE 35 08 582 C2, which has a resilient padding in the area of the reflex zones of the foot. This padding has a symmetrically or asymmetrically concavely arched, or respectively bulged shape, and is essentially circular in a view from above, and is therefore used for stimulating the nerves in these reflex zones. The reflex zones in the feet have an exclusive effect on the nervous system which, inter alia, affects the arterial blood supply of defined organs. No remedy for the problems of venous outflow of blood mentioned at the outset, in particular in the area of the lower leg, can be achieved by this.

It is therefore the object of the present invention to create an inner sole for a shoe of the type mentioned at the outset, which makes possible a considerable improvement of the venous return flow through the legs into the body, starting at the foot, by means of synergistic support of the muscle contraction in the course of the movement of the foot and ankle joints.

To attain this object, the characteristics recited in claim 1, or respectively in claim 4, are provided in connection with an inner sole for a shoe of the type mentioned.

Suitable support areas, which positively affect a contraction of the musculature of the foot, result from the steps in accordance with the invention, wherein the pillow-like layers are not raised separately, but are placed in a plateau-like manner into defined areas of the foot and are divided into fields which are separated from each other. These discrete support points are arranged in such a way that the muscle



contraction is prompted, or respectively stimulated and therefore improved during the normal movement of the foot, but also considerably while standing. This results in a synergistic support during the movement sequence of the individual joints which, as a continuous homogeneous movement wave, has a positive effect on the venous and lymphatic vessel system. In other words, a homogeneous mechanical squeezing of the venous and lymphatic vessel system takes place, which leads to an increase in the venous return flow from the legs in the direction toward the body. This characteristic support movement promotes the action of the so-called foot and calf muscle pump, in particular since the division of the pillow-like layers into individual areas is similar to the arrangement of the muscles in the foot.

With further embodiments in accordance with the characteristics of claim 2 and/or 3 and/or 5 and/or 6, pillow-like layers are provided in further important areas of the muscle arrangement.

Alternative embodiments are the result of the characteristics of claim 7, or respectively claim 8. It is practical here to provide the characteristics in accordance with claim 9 or 10.

Further advantageous embodiments result from the characteristics of one or several of claims 11 to 15.

In accordance with the characteristics of claims 16 or 17, the inner sole for a shoe can either be individually employed as an insole, or it is provided as a sole which is directly integrated into a shoe.

Further details of the invention can be taken from the following description, in which the exemplary embodiments represented in the drawings are described in detail and explained. Shown are in:

- Fig. 1, a view from above on an inner sole of a shoe in accordance with a first exemplary embodiment of the present invention,
- Fig. 2, a section along the line II - II in Fig. 2 in an enlarged view,
- Fig. 3, a section along the line III - III in Fig. 1 in an enlarged view, and
- Figs. 4 and 5, respectively a section similar to the one in Fig. 3, but in accordance with two variants of the first exemplary embodiment,
- Fig. 6, a view from above on an inner sole of a shoe in accordance with a second exemplary embodiment of the present invention,
- Fig. 7, a longitudinal section similar to the one in Fig. 3, but through the second exemplary embodiment,
- Fig. 8, an interior view in the longitudinal direction of the second exemplary embodiment,
- Fig. 9, a view from above on the pre-processing stage of the inner sole of the shoe in accordance with the second exemplary embodiment of the present invention,
- Fig. 10, a longitudinal sectional view similar to the one in Fig. 7, but in the longitudinal direction of Fig. 9,
- Fig. 11, a view from above on an inner sole of a shoe in accordance with a variant of the second exemplary embodiment of the invention, and
- Fig. 12, a longitudinal section similar to the one in Fig. 7,

but through the variation of the second exemplary embodiment.

The inner sole 11, or respectively 111, or respectively 111' represented in the drawings and embodied as a foot support, for example, in accordance with two exemplary embodiments and a variant of the second exemplary embodiment of the present invention, is used for the synergistic support of the musculature in the course of the movement of the foot and ankle joints for improving the conveyance of fluids in the venous and lymphatic vessel system through the legs, and it can be embodied as an insole or as a sole integrated into a shoe.

As can be seen from Figs. 1 and 6, the inner sole 11, or respectively 111 has several pillow-like layers 12 to 16, or respectively 112 to 116 provided over the sole surface 17, or respectively 117, of which the pillow-like layers 12, 112, 13, 113 and 14, 114 are divided into separate, plateau-like fields 18 to 22, 118 to 122, or respectively 23 to 25, or respectively 123 to 125, or respectively 26, 27, 126, 127, which are separated from each other.

The first pillow-like layer 12, 112 is provided in the forefoot joint area, i.e. in the area of the toes. This first pillow-like layer 12, 112 is divided into five fields 18 to 22, 118 to 122, which are separated from each other and arranged next to each other in the transverse direction of the inner sole 11, 111. The individual fields 18 to 22, 118 to 122 are of different width and length, approximately corresponding to the base area of the partial areas of the respective individual toes. This is correspondingly true for the shape of the front and rear borderline 28, 128, or respectively 29, 129, of this first pillow-like layer 12, 112. The second pillow-like layer 13, 113 is provided in the transition area between the metatarsus and the tarsus and in an area facing away from the plantar arch. This second pillow-like layer 13,

113 is divided into three fields 23 to 25, 123 to 125, which are shaped to correspond to this partial area of the metatarsus/tarsus and are arranged divided and lying next to each other in the transverse direction of the inner sole 11, 111. This is correspondingly true for the circumferential borderline 31, 131 of this second pillow-like layer 13, 113. The third pillow-like layer 14, 114 is provided in a transition area between the metatarsus and the heel and divided into the two fields 26, 126 and 27, 127 which, viewed in the transverse direction of the inner sole 11, 111, lie next to each other and are provided laterally on the outside. Here, too, the circumferential borderline 32, 132 approximately corresponds to the transition area between the metatarsus and the heel.

The fourth pillow-like layer 15, or respectively 115, is arranged in the area of the heel and is designed in a plateau-like manner as a uniform, non-divided layer, which is approximately oval in the transverse, or respectively longitudinal direction of the inner sole 11, 111. The fifth pillow-like layer 16, 116 is also embodied as a uniform, non-divided layer, but is provided in the approximately shape of a sickle in the area of the plantar arch.

The pillow-like layers 12 to 16, 112 to 116 are made of a resilient (foam) material, for example silicon. They have a flat upper surface and are embodied to be approximately rectangular, advantageously slightly trapezoidal, in cross section.

In the first exemplary embodiment in accordance with Figs. 1 to 3, the inner sole 11 has a sole base body 36, which here is triple-layered, constitutes the basic shape of the inner sole 11 and in accordance with Fig. 1 is designed to correspond to a foot, here the right foot. It is understood that the corresponding other, i.e. left inner sole 11, is designed to be mirror-symmetrical. The sole base body 36 consists, for

example, of three cork layers 33, 34, 35. A sole cover layer 37 which, for example is made of leather, is provided on the sole base body 36. The pillow-like layers 12 to 16 are arranged in the sole base body 36 in a recessed manner between the sole base body 36 and the sole cover layer 37. The upper and center layers 33, 34 of the sole base body 36 are provided with corresponding depressions 38 for this purpose which, corresponding to the fields 18 to 27 of the pillow-like layers 12 to 14 and corresponding to the pillow-like layers 15, 16, have different base surfaces. The depressions 38 have been worked into the sole base body 36 to such a depth that the respective flat top of the plateau-like, pillow-like layers 12 to 15 lies approximately in a plane, i.e. co-planar with the surface of the sole base body 36. The pillow-like layer 16 constitutes an exception. With this exemplary embodiment the depressions 38 extend as far as the top of the lower layer 35. Among themselves, the pillow-like layers 12 to 15 are of approximately the same height and are in a range between 2 to 5 mm, preferably in a range at 3 mm. The material of the top, or respectively the sole cover layer 37, covers the pillow-like layers 12 to 16 in such a way, that they, or respectively their fields 18 to 27, are enclosed by a depression along the edge and are fixedly connected with, preferably glued to, the central layer 34 of the sole base body 36, so that, besides the borderlines 28, 29 and 31, 32, intermediate borderlines 41 to 47 result, which extend approximately vertically in respect to the transverse direction of the inner sole 11. In other words, the depressions 38 are designed to correspond to the total base surface of the pillow-like layers 12 to 15.

With the two variants of this in accordance with Figs. 4 and 5, the surface arrangement of the pillow-like layers 12 to 15 of the inner sole 11 of the shoe, including the arrangement of the fields 18 to 27, is exactly the same as shown in Fig. 1. The essential difference of the variants in Figs. 4 and 5 in respect to the exemplary embodiment of Figs. 2 and 3 rests in that a pillow-like resilient intermediate layer 51', or

respectively 51'' is provided over the entire surface of the sole base body 36' between the sole base body 36', or respectively 36'', and the sole cover layer 37', or respectively 37''. Here, the intermediate layer 51 is made of the same resilient material as the pillow-like layers 12 to 16 and is fixedly connected with, preferably glued to, the entire surface of one of the layers 34' (Fig. 4), or respectively 35'' (Fig. 5), which have no depressions, of the sole base body 36'.

In accordance with Fig. 5, the pillow-like intermediate layer 51'' is of a thickness in the range between 2 to 3 mm, which is approximately uniform over the entire base surface, so that a continuous flat pillow results, which is considerably more resilient than the layers of the sole base body 36'. Compared with Fig. 3, in this variant of the intermediate layer 51'' has been placed over the entire surface between the lower layer 35' and the center layer 34''.

In accordance with Fig. 4, the intermediate layer 51' lies between the center layer 34' and the upper layer 33' and has a different thickness. Accordingly, here the upper layer 33' is provided with depressions 38', and the pillow-like intermediate layer 51' with depressions 52 corresponding to the depressions 38 for receiving the pillow-like layers 12 to 16, over which the upper material, or respectively the sole cover layer 37' again extends in the same way as the sole cover layer 37 in accordance with Figs. 2 and 3.

With the second exemplary embodiment in accordance with Figs. 6 to 10, the inner sole 111 has a dual-layer sole base body 136, which constitutes the basic shape of the inner sole 111 and which in accordance with Fig. 6, or respectively 9, is designed to correspond to a foot, here the left foot. It is also understood here that the corresponding other, i.e. the right inner sole, is designed to be mirror-symmetrical. The sole base body 136 is constructed from two cork layers, for

example. A sole cover layer 137 is provided on the sole base body, which is made of leather, for example.

The pillow-like layers 112 to 115 are arranged between the sole base body 136 and the sole cover layer 137 in a recessed manner. The sole base body 136 is provided with corresponding depressions 138 for this purpose which, corresponding to the fields 118 to 127 of the pillow-like layers 112 to 114 and corresponding to the pillow-like layer 115, have a different base surface. Figs. 9 and 10 show the corresponding depressions 138 in a view from above, or respectively in section. Thus, the sole base body 136 has a maximum thickness in the range between 3.5 to 4 mm, preferably 3.7 mm, and a minimum thickness in the area of its depressions 138 between approximately 1 mm and 1.5 mm, preferably 1.3 mm. It is furthermore indicated in Fig. 9 that the entire surface 136 of the sole base body 136, which for example is multi-layered, is covered with a thin textile cover 139. It is possible in a manner not shown that, instead of or in addition to this, the underside 154 of the sole base body 136 can be covered over its entire length with such a thin textile cover. The sole base body 136, or respectively its layers, are made of cork scrap compacted by means of a binder.

In accordance with Fig. 7, the entire surface 153 of the sole base body 136 is moreover covered with a resilient, or respectively pillow-like intermediate layer 151. The intermediate layer 151 thus covers the entire surface, including the depressions 138 of the sole base body 136, so that depressions 152 corresponding to the depressions 138 remain in the intermediate layer 151. The intermediate layer 151 has a continuous thickness of, for example, approximately 3 mm. The same as the pillow-like layers 112 to 116, the intermediate layer 151 is preferably made of a foamed material, for example foamed natural latex.

The pillow-like layers 112 to 115 have been placed into the

depressions 152 of the intermediate layer 151 and consist, for example, of the said foamed natural latex and have a thickness in the range between 4 and 5 mm, preferably of 4.5 mm, for example. In contrast thereto, the pillow-like layer 116 for the plantar arch of the foot is not arranged in a depression, but directly on the intermediate layer 151, which in this area is flat, i.e. not provided with depressions. On its thickest part, this pillow-like layer 116 also has a thickness of approximately 4 to 5 mm, preferably 4.5 mm, wherein its thickness continuously decreases toward the inside of the sole 111. Thus, the flat surfaces 156 of the plateau-like, pillow-like layers 112 to 115 are raised by 1.5 to 2.5 mm, preferably approximately 2 mm, above the surface 157 of the intermediate layer 151. The material on the top, or respectively the sole cover layer 137, covers the pillow-like layer 116 and furthermore the pillow-like layers 112 to 115 in such a way that the latter, or respectively their fields 118 to 127, are enclosed by a depression along the edge and are fixedly connected with, preferably glued to, the intermediate layer 151 so that, besides the borderlines 128, 129 and 131, 132, intermediate borderlines, or respectively areas 141 to 147, result, which extend approximately vertically in respect to the transverse direction of the inner sole 111.

The variant represented in Figs. 11 and 12 differs from the second exemplary embodiment only in the design of the second pillow-like layer 113'. Figs. 11 and 12 for this variant have the same reference numerals as those in Figs. 6 to 10, only a prime has been added.

In accordance with Figs. 11 and 12, the second pillow-like layer 113' is provided with the outer field 125', the center field 124' and the inner field 123', wherein the two former are designed in accordance with the representations in Figs. 6 and 7. In comparison with the field 123 in Fig. 6, the inner field 123' of the second pillow-like layer 113' has been pulled forward in a bow shape toward the first pillow-like



layer 112'. This bow-shaped extended area 123' lengthens and widens the front surface of the field 123'. As can be seen in Fig. 12, this bow-shaped extended area 123' is not level like the remaining surface areas of the pillow-like layer 113', but is arched upward, i.e. again raised in relation to the raised surface of the sole cover layer 137'. This arching raises the level of the bow-shaped extended area 123' in relation to the remaining area of the field 123' and the fields 124' and 125' by approximately 2 mm.

## Claims

1. An inner sole (11) of a shoe, with a sole base body (36), with a sole cover layer (37) and with several pillow-like layers (12, 13, 14, 15, 16) arranged on the surface of the sole, characterized in that a first pillow-like layer (12) is provided in the forefoot joint area, a second pillow-like layer (13) in the metatarsus/tarsus transition area, and a third pillow-like layer (14) in the metatarsus/heel transition area, that each of these pillow-like layers (12, 13, 14) is itself divided into individual plateau-like fields (18 to 27), which are positioned next to each other in the transverse direction of the sole surface (17) and are separated from each other, and that the surface of the pillow-like layers (12, 13, 14), which is also covered by the sole cover layer (37), approximately forms a plane with the surface of the sole base body (36).
2. The inner sole of a shoe in accordance with claim 1, characterized in that a fourth pillow-like layer (15) is provided in the area of the heel, which is plateau-shaped, preferably ovally homogeneous in the transverse direction of the sole and approximately forms a plane with the surface of the sole base body (36).
3. The inner sole of a shoe in accordance with claim 1 or 2, characterized in that a fifth pillow-like layer (16) in the shape of a sickle is provided in the area of the plantar arch.
4. An inner sole (111) of a shoe, with a sole base body (136), with a sole cover layer (137) and with several pillow-like layers (112, 113, 114, 115, 116) arranged on the surface of the sole, characterized in that a first pillow-like layer (112) is provided in the forefoot joint

area, a second pillow-like layer (113) in the metatarsus/tarsus transition area, and a third pillow-like layer (114) in the metatarsus/heel transition area, that each of these pillow-like layers (112, 113, 114) is itself divided into individual plateau-like fields (118 to 127), which are positioned next to each other in the transverse direction of the sole surface (117) and are separated from each other, and that the surface of the pillow-like layers (112, 113, 114), which is also covered by the sole cover layer (137) is raised in respect to the plane of the surface of the sole base body (136).

5. The inner sole of a shoe in accordance with claim 4, characterized in that a fourth pillow-like layer (115) is provided in the area of the heel, which is plateau-shaped, preferably ovally homogeneous in the transverse direction of the sole and is raised in relation to the plane of the sole base body (136).
6. The inner sole of a shoe in accordance with claim 4 or 5, characterized in that a fifth pillow-like layer (116), which is raised in relation to the plane of the sole base body (136), is provided in the area of the plantar arch.
7. The inner sole of a shoe in accordance with at least one of claims 1 to 6, characterized in that the pillow-like layers (12 to 16, 112 to 116) have been recessed in the sole base body (36, 136).
8. The inner sole of a shoe in accordance with at least one of claims 1 to 7, characterized in that an intermediate layer (51', 51'', 151) is provided between the sole base body (36', 136) and the sole cover layer (37', 137), or respectively the pillow-like layers (12 to 16, 112 to 116), which constitutes a full surfaced, additional, pillow-like layer.

9. The inner sole of a shoe in accordance with claim 8, characterized in that the intermediate layer (51'', 151) has an approximately even thickness of preferably approximately 2 to 4 mm, preferably 3 mm.
10. The inner sole of a shoe in accordance with claim 8, characterized in that the first to fifth pillow-like layers (12 to 16) are recessed in depressions (52') of the intermediate layer (51').
11. The inner sole of a shoe in accordance with claim 8, characterized in that the first to fifth pillow-like layers (112 to 115) are arranged on the intermediate layer (151).
12. The inner sole of a shoe in accordance with at least one of the preceding claims, characterized in that the sole base body (36, 136), preferably in layers, consists of a cork granulate compacted by means of binding agent.
13. The inner sole of a shoe in accordance with claim 12, characterized in that the sole base body (136) has a thickness of approximately 3.5 to 4 mm in its thickest areas, and approximately 1 to 1.5 mm in its thinnest areas.
14. The inner sole of a shoe in accordance with one of the preceding claims, characterized in that the second pillow-like layer (113') is provided with an inner field (123'), which is provided with an area (123''), which is pulled forward in a bow shape toward the first pillow-like layer (112').
15. The inner sole of a shoe in accordance with claim 14, characterized in that the bow-shaped, pulled-forward area (123'') of the inner field (123') of the second pillow-like layer (113') is arched upward in respect to the

remaining raised surface of the sole cover layer (137') of the remaining areas, or respectively fields of the second pillow-like layer (113').

16. The inner sole of a shoe in accordance with claim 15, characterized in that the arching of the bow-shaped, pulled- forward area (123") raises the level by approximately 2 mm.
17. The inner sole of a shoe in accordance with at least one of the preceding claims, characterized in that the sole base body (136) is covered over its entire upper and/or lower side by a textile cover.
18. The inner sole of a shoe in accordance with at least one of the preceding claims, characterized in that the pillow-like layers (13 to 16, 113 to 116) and/or the intermediate layer (51, 151) are constituted by a soft foam material.
19. The inner sole of a shoe in accordance with at least one of claims 1 to 18, characterized in that it is designed as an exchangeable insole.
20. The inner sole of a shoe in accordance with at least one of claims 1 to 18, characterized in that it is designed as a sole which is integrated into a shoe.

## Abstract of Disclosure

The present invention relates to an inner sole for a shoe, comprising a base body, a covering layer and several cushioned layers arranged on the surface of the sole. A first cushioned layer is provided in the ball area of the forefoot, a second cushioned layer is included in the transition area of the metatarsus and the tarsus and a third cushioned area is provided between the metatarsus and the heel. The cushioned layers are subdivided into individual, separate plateau-like fields which are located close to each other in the transversal direction of the sole surface. This provides an inner sole which brings about a substantial improvement in the transport of fluids in the venous and lymphatic vessel system in the legs during movement of the foot joints and ankle joints by means of synergistic support of the muscle structure.

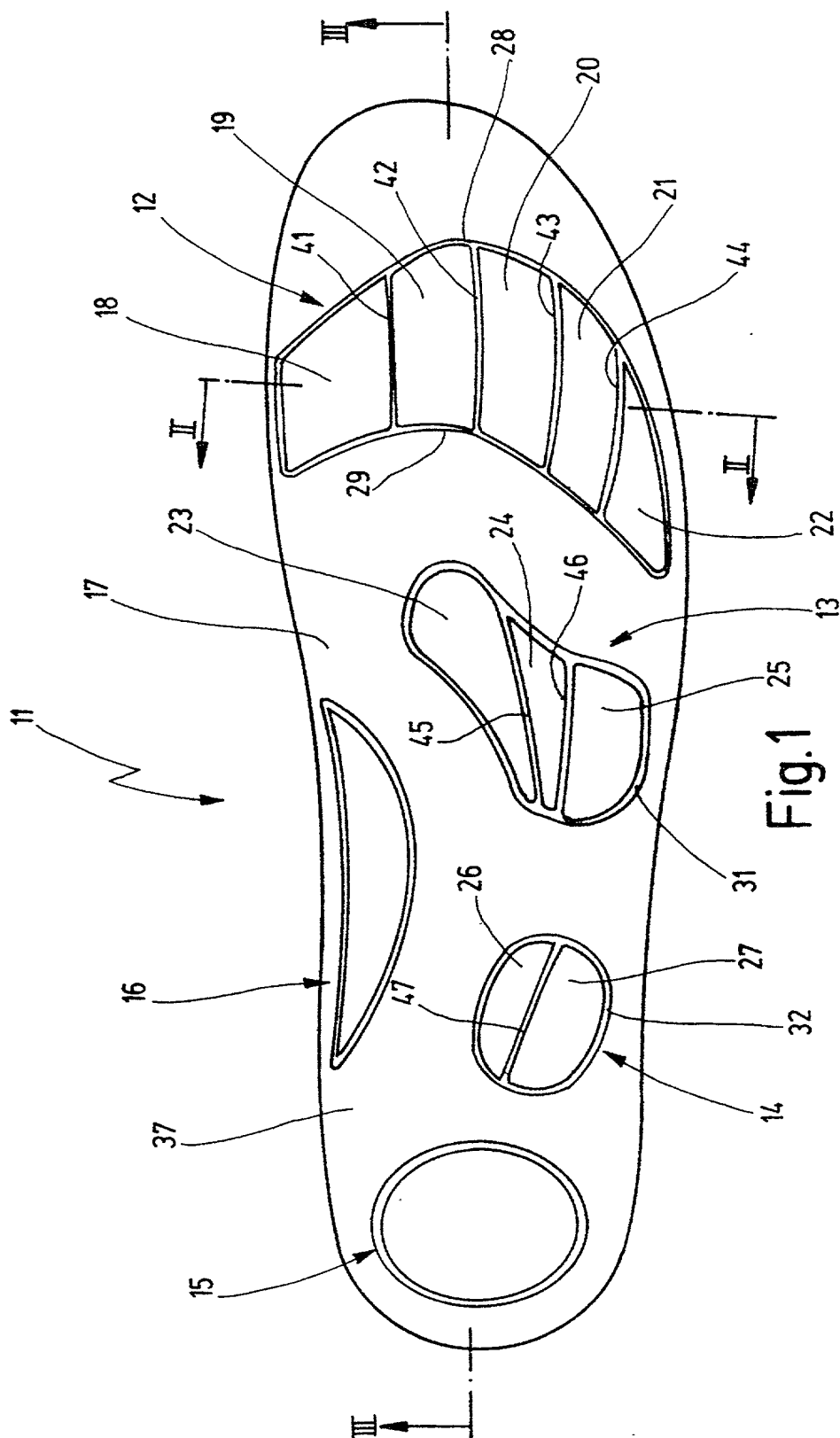


Fig.1

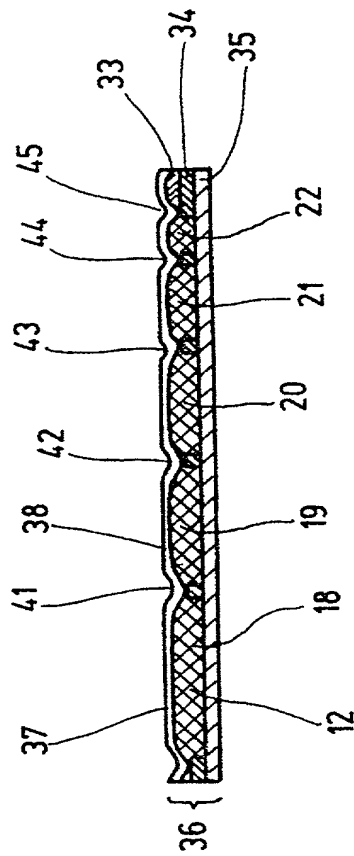


Fig. 2

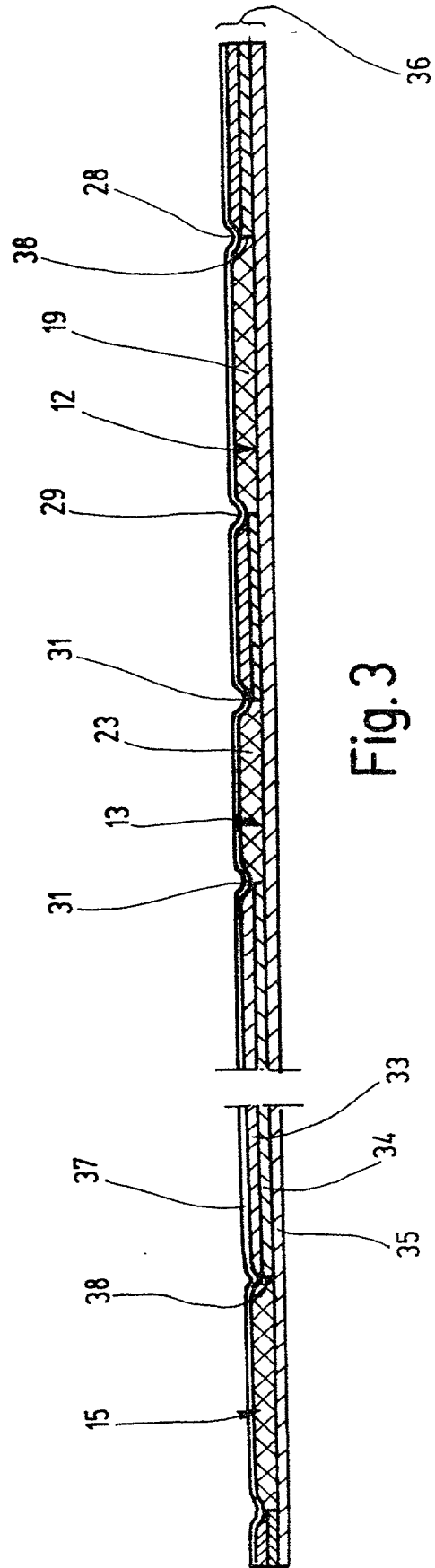


Fig. 3



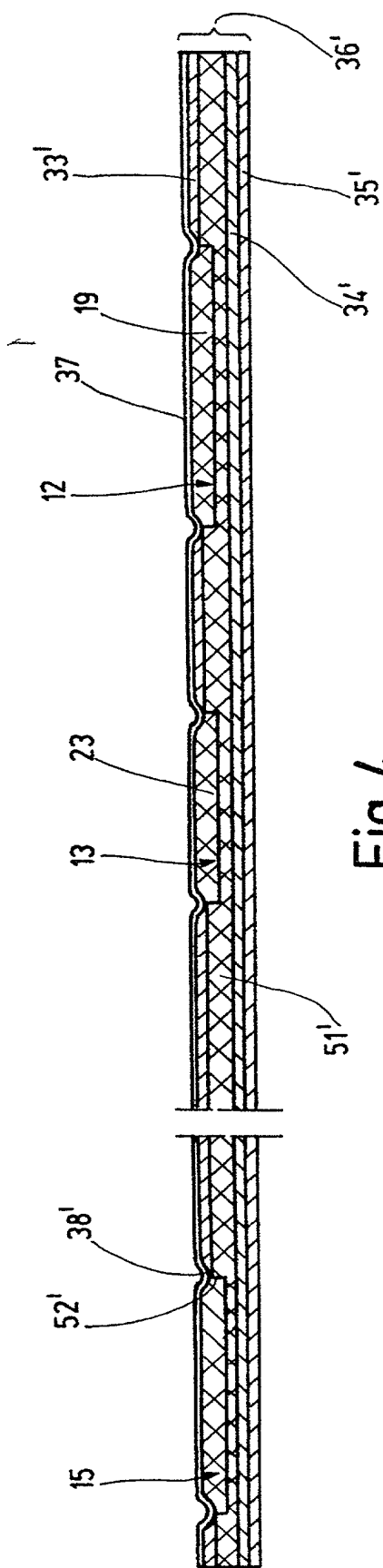


Fig. 4

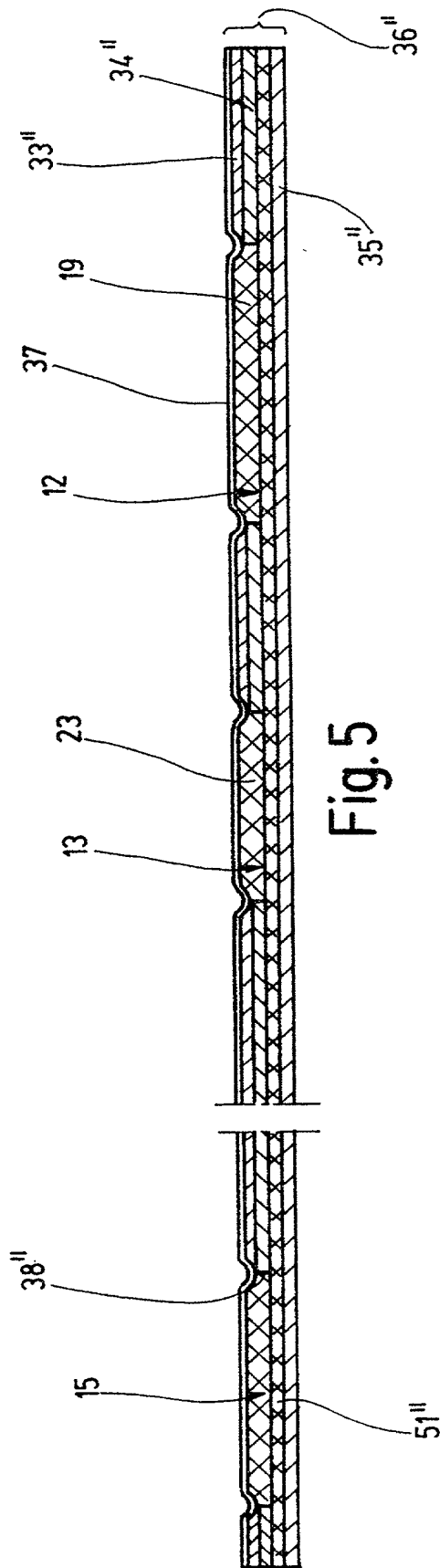


Fig. 5

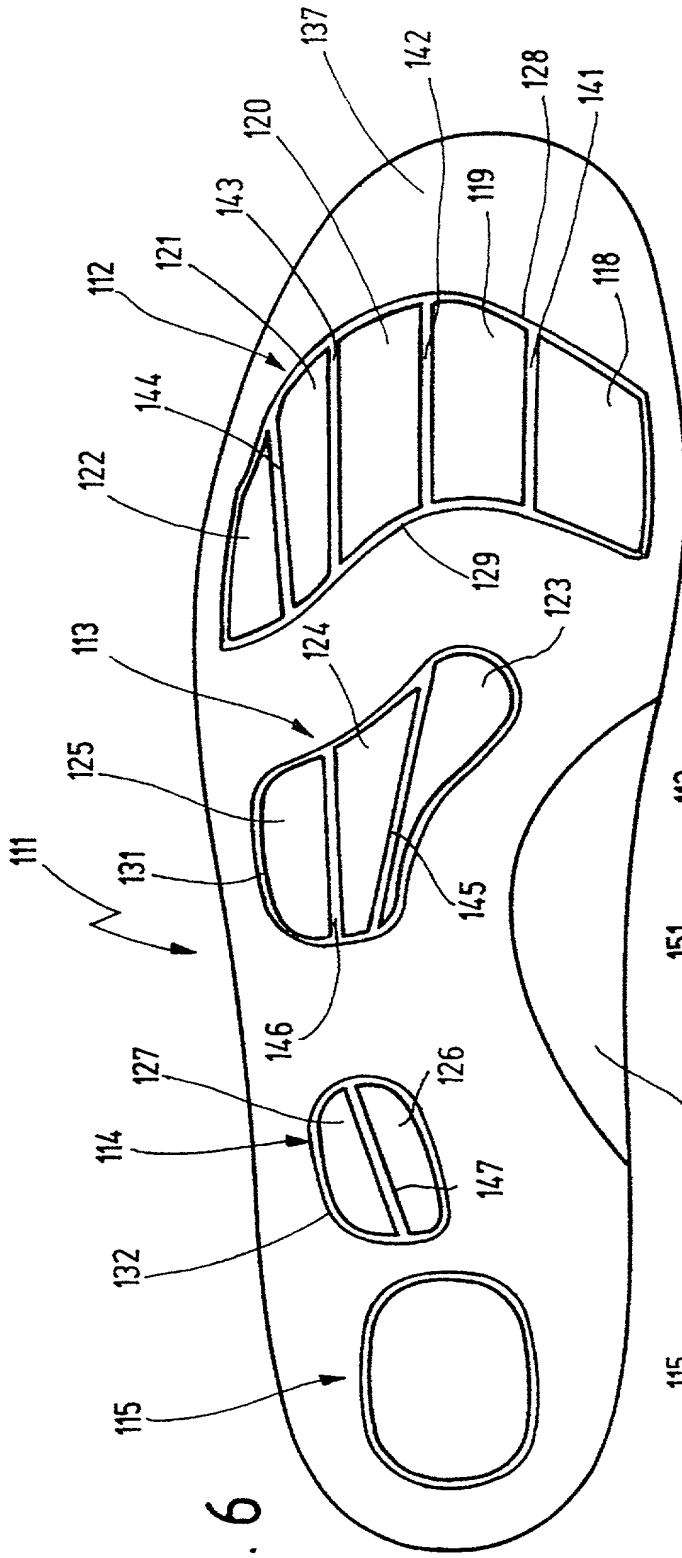


Fig. 6

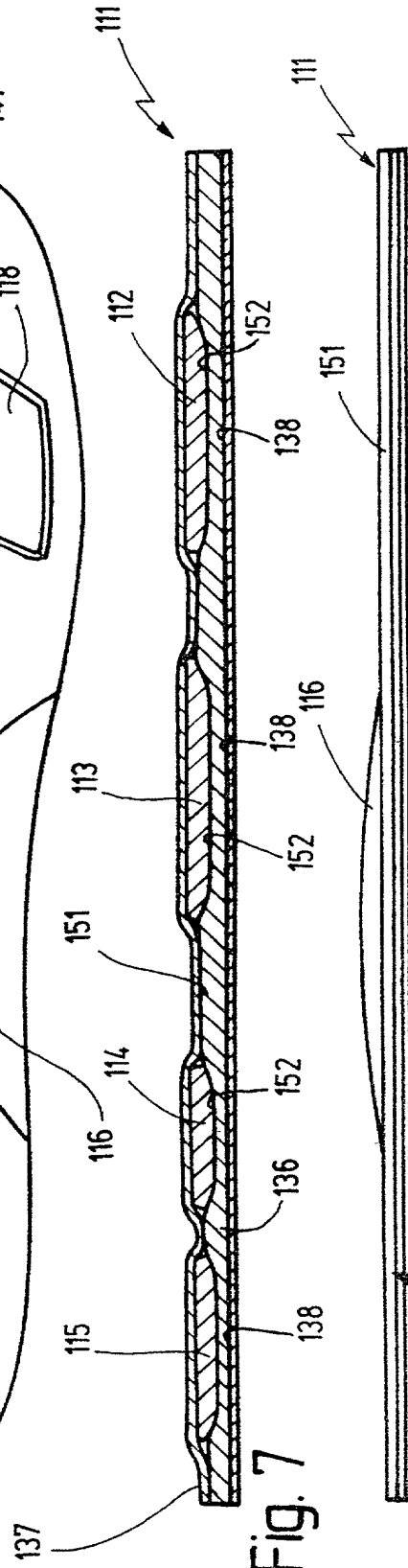


Fig. 7

Fig. 8

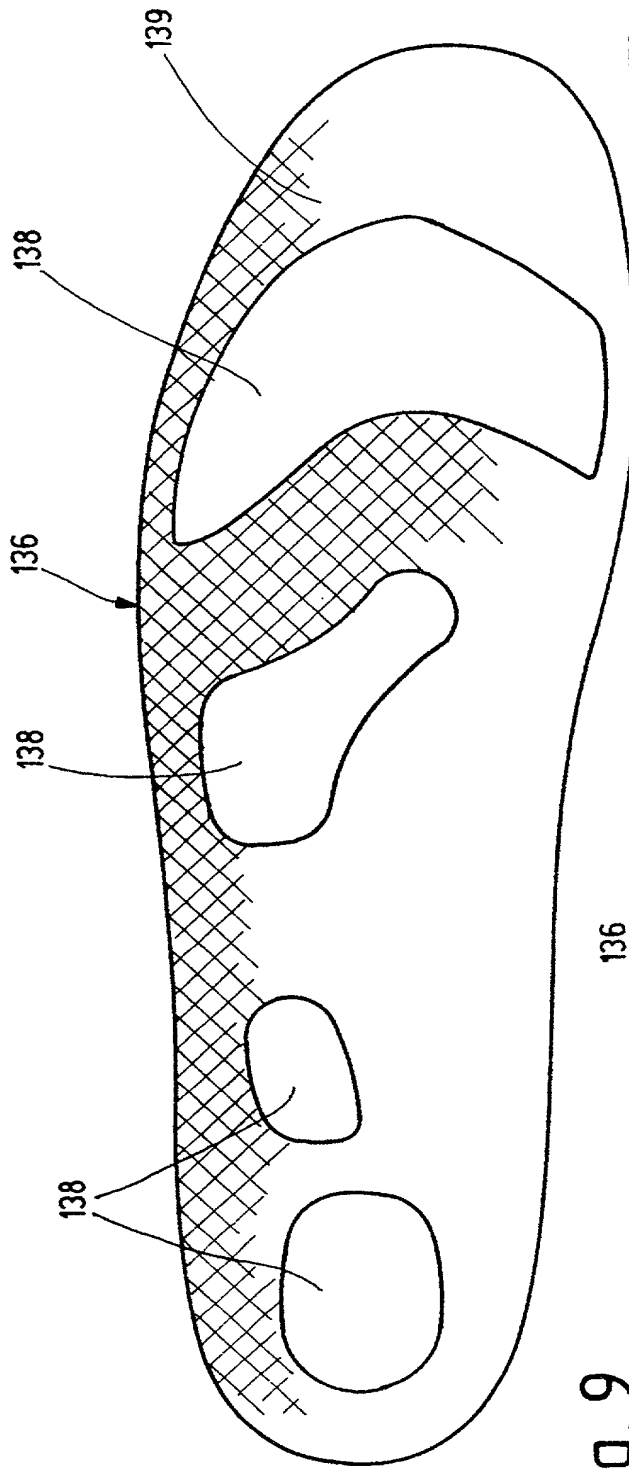


Fig. 9

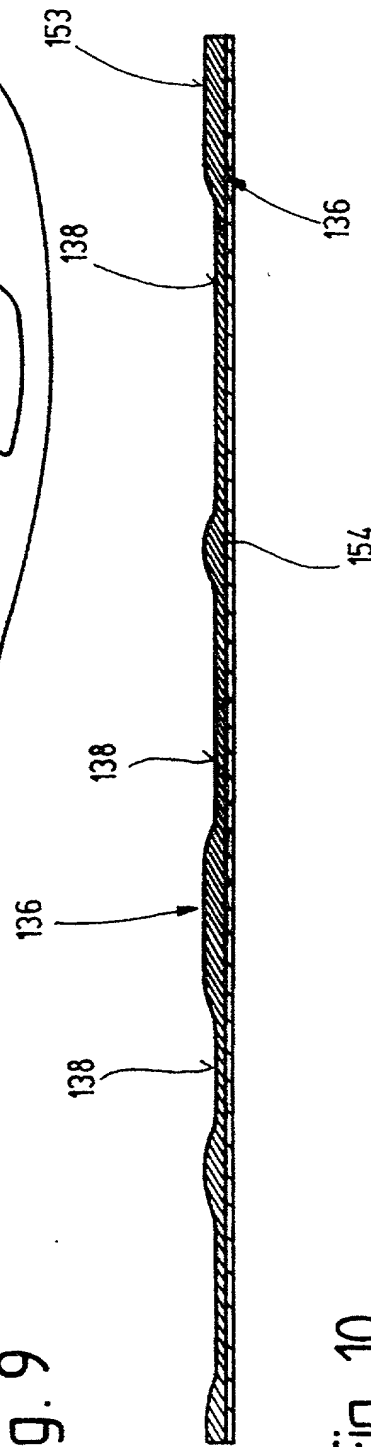


Fig. 10

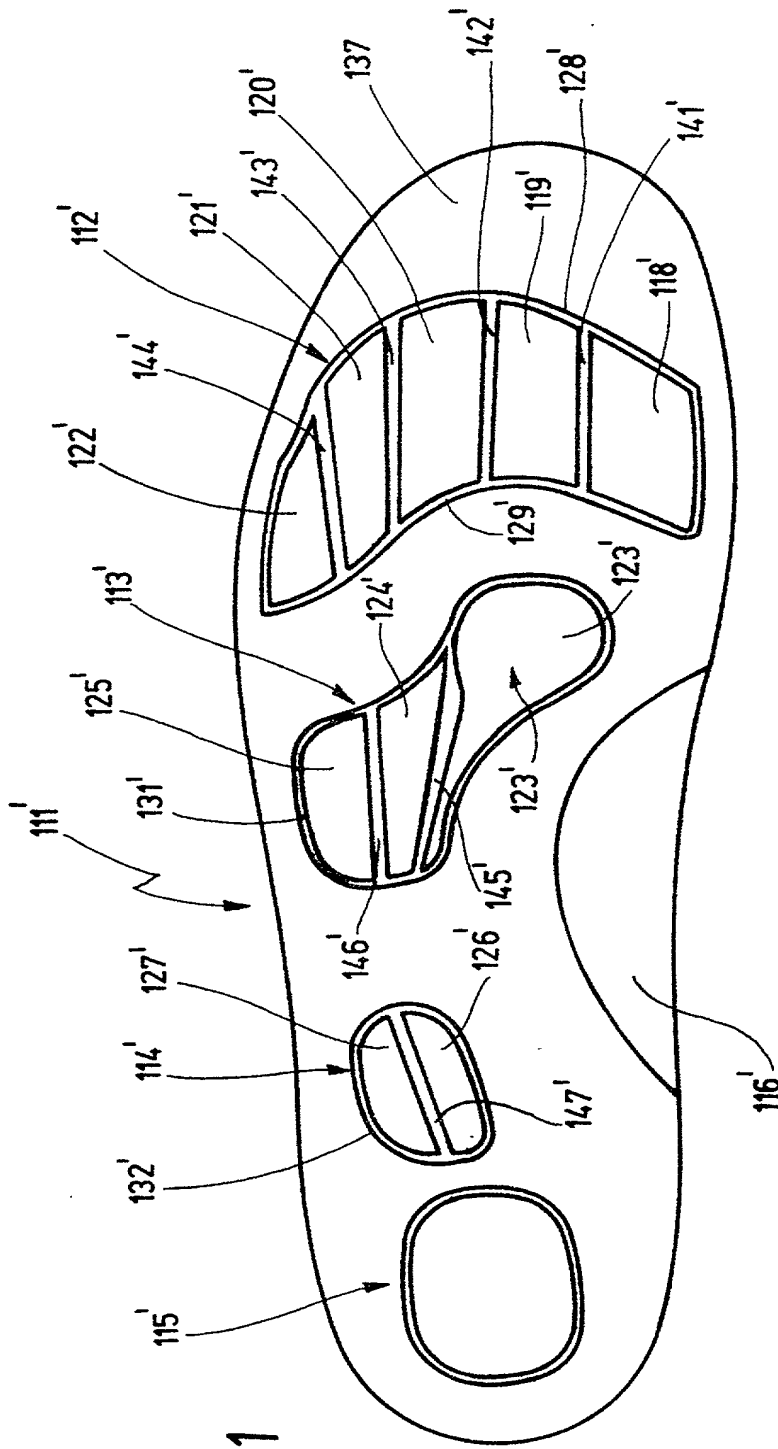


Fig. 11

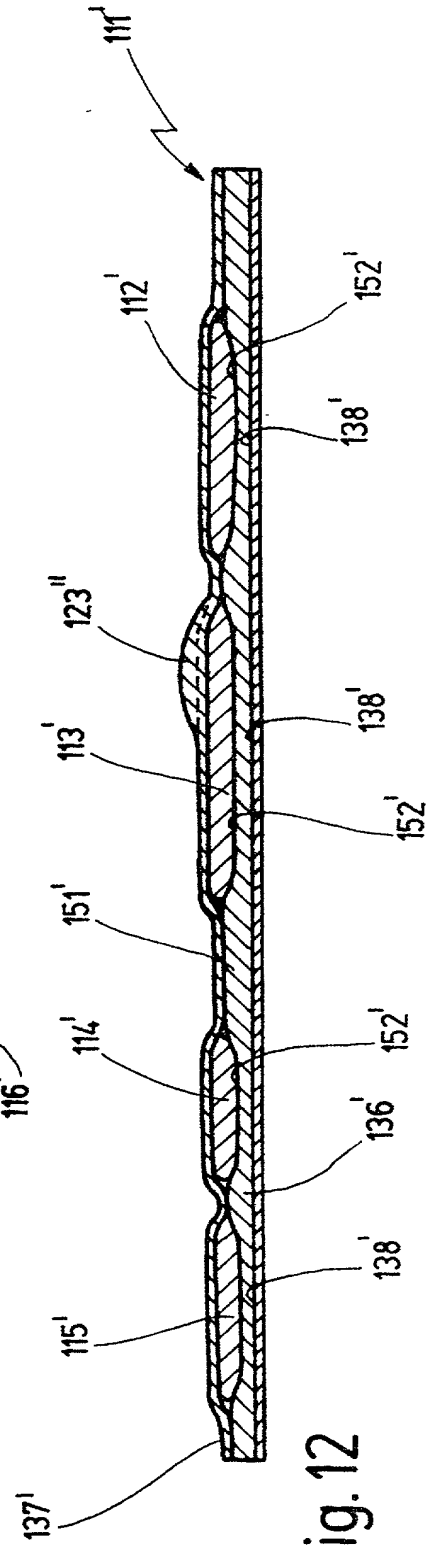


Fig. 12

**COMBINED DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that:

This declaration is of the following type:

- ☐ original
- ☐ design
- ☐ supplemental
- ☒ national stage of PCT
- ☐ divisional
- ☐ continuation
- ☐ continuation-in-part (CIP)

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed for and for which a patent is sought on the invention entitled:

**CIRCUIT FOR THE PROTECTION OF ELECTRICAL DEVICES**

the specification of which

☒ is attached hereto

☐ was filed on \_\_\_\_\_, as

Application No. \_\_\_\_\_

and was amended on \_\_\_\_\_

(if applicable)

☒ was described and claimed in PCT International application

No. PCT/EP98/02706 filed on 08 May 1998

and as amended under PCT Article 19 on \_\_\_\_\_

(if any).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any Amendment referred to above.

I acknowledge duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Sec. 1.56.

☒ In compliance with this duty there is attached an information disclosure statement. 37 CFR 1.97.

I hereby claim foreign priority benefits under Title 35, United States Code, Sec. 119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

☐ no such applications have been filed  
☒ such applications have been filed as follows.

**Prior Foreign Application(s)**

<u>197 20 142.3</u> (Number)	<u>Germany</u> (Country)	<u>14/May/1997</u> (D/M/Y filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<u>197 32 786.9</u> (Number)	<u>Germany</u> (Country)	<u>30/July /1997</u> (D/M/Y filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
<u>198 01 301.9</u> (Number)	<u>Germany</u> (Country)	<u>16/Jan./1998</u> (D/M/Y filed)	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

<u>(Appln Serial No.)</u>	<u>(Filing Date)</u>	<u>(patented, pending, abandoned)</u>
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I hereby claim the benefit under Title 35, United States Code, Sec. 120 of any United States application(s) listed below, and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Sec. 112, I acknowledge the duty to disclose all information known to be material to patentability as defined in Title 37, Code of Federal Regulations, Sec. 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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I hereby declare all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00 Full name of sole or first inventor Hans SEITER

Inventor's signature

Hans Seiter

Date

8.23.99

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